|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Topic:** C6 Earth and atmosphere | | **8 – 10 lessons**  In this topic you will learn how the structure of the earth and the rocks it is formed from shapes the way our planet and it’s atmosphere was formed. We will then take a look at how we as humans are affecting the composition of the atmosphere and the ways in which this affects our planet. | | | |
| **Core Questions for the Unit** | 1. What is the structure of the Earth? 2. State the three layers of the Earth. 3. Describe what a mineral is. 4. Describe the composition of different minerals. 5. Explain the structure of the Earth and how scientists have learnt about its structure through shockwaves from Earthquakes. 6. Explain the movement of tectonic plates using convection currents. 7. How are igneous, metamorphic and sedimentary rocks formed? 8. State the rocks are classified into three groups. 9. Describe/explain the properties of sedimentary, igneous and metamorphic rock. 10. Explain how sedimentary, metamorphic and igneous rocks are formed. 11. Compare the differences between the processes, weathering, transport, erosion, deposition, compaction and cementation and link to formation of rocks. 12. Practical opportunity – crystal formation 13. What is the rock cycle? 14. Describe what the rock cycle is. 15. Describe simply the processes involved in the rock cycle and how this process takes place over millions of years. 16. Explain using detailed Science how sedimentary, igneous and metamorphic rock interconvert. 17. Explain the processes that drives the rock cycle. 18. Combustion   a.) Define combustion  b.) Describe the different between complete and incomplete combustion  c.) Explain the effects of combustion on the atmosphere.  d.) Practical opportunity – energy released by fuels     1. What is the carbon cycle? 2. Identify processes that add carbon to the atmosphere. 3. Identify processes that remove carbon from the atmosphere. 4. Explain the processes that add and remove carbon from the atmosphere. 5. What makes up the atmosphere? 6. Identify the % composition of gases in the atmosphere. 7. Describe simply how levels of gases in the atmosphere have changed over time. 8. Explain the processes that have led to changes in the Earth’s atmosphere. 9. How does human activity contribute to global carbon dioxide levels?   a.) Identify 3 greenhouse gases.  b.) Describe the effect of greenhouse gases on the environment.  c.) Explain how greenhouse gases help to maintain the temperature of the atmosphere.   1. Explain what global warming is. 2. Interpret data to explain the link between increase carbon dioxide levels and temperature. 3. Make links between greenhouse gases and global warming. 4. How do carbon dioxide emission impact on the climate? 5. Describe how carbon dioxide impacts on the environment. 6. Describe how human activities impact on carbon dioxide levels. 7. Explain some human activities that increase carbon dioxide levels in the environment. 8. Interpret data to explain links between human activity and global warming. 9. Explain national and global strategies that are in place to reduce emissions of carbon dioxide levels in the atmosphere. 10. Construct arguments for or against human activity and global warming. | | | | |
| **Links to other subjects** | **Geography**: Formation of rocks, Rock cycle, Carbon Cycle and Global warming  **English**: Literacy skills through vocabulary, verbal and written communication  **Maths**: Interpreting and analysing data | | | | |
| **Scientific skill**  **Practical lessons that you will do in this topic:**  **1. Crystal formation**  **2. Energy released by fuels** | Questions to be answered:   * What is the effect of temperature on crystal formation in igneous rocks? * Do all fuels release the same amount of energy? * Present sketches of crystals formed * Calculating temperature change of water, energy released per gram of fuel * Explain observations using scientific theories * Make predictions about efficiency of fuel sources * Risk assessment * Sources of error and inaccuracies in the practical method | | | | |
| **Vocabulary:**  **Key words and terms you will need to know for this topic.** | **Tier 2 Words:**    Analyse  Changes  Changes  Compare  Conclusion  Contrast  Core  Cycle  Durable  Earth  Evaluate  Formula  Function  Link  Observation  Patterns  Prediction  Process  Record  Similarities  Structure  Table  Transport | | **Tier 3 Words:**  **Atmosphere**  **Carbon Cycle**  **Carbon Sinks**  **Cementation**  **Combustion**  **Compaction**  **Crust**  **Deposition**  **Erosion**  **Fossil Fuels**  **Global warming**  **Grains**  **Greenhouse Gases**  **Igneous**  **Lava**  **Magma**  **Mantle**  **Metamorphic**  **Minerals**  **Photosynthesis**  **Porous**  **Respiration**  **Sedimentary**  **Sediments**  **Strat**  **Uplift**  **Weathering** | **Reading Opportunities**  **Numeracy Opportunities** | * Article and DIRT activity about global warming and human impact on the environment. * Science textbooks. * Geography textbooks. * Interpreting data from graphs, analysing data, presenting data. |
| **Some of the activities you will do during lessons on this topic.** | 1. **What is the structure of the Earth?**   - Retrieval Practice: Picture of the earth used for students to write down 3 facts they know about the structure of the Earth/what it is made of.  - Decode it now: Composition.  - CLT map for comparing rocks and minerals.  - Video to label diagram showing 3 layers of the Earth and answer questions about the Earth’s structure  <https://www.youtube.com/watch?v=WjXSCumeqxo>  LA: <https://www.youtube.com/watch?v=eXiVGEEPQ6c>  - Use picture of Pangaea vs Earth now to introduce convection currents.  - CLT map: flow diagram to show process convection currents – eChalk activity to demo. <https://subscription.echalk.co.uk/Science/physics/convection/convection.html>  - Link to careers: Explain the role of seismologists and how they use shockwaves from Earthquakes used to deduce Earth’s structure. Can introduce theory of P and S waves for HA groups.  **2) How are igneous, metamorphic and sedimentary rock formed?**  - DIN task: Knowledge based recall questions based on content from L1. Students use pictures of 3 types of rock to identify different properties based on what they look like.  - Sorting activity for examples of sedimentary, metamorphic and igneous rocks, using physical examples (if possible)  - Reading and comprehension style questions, describing and explaining the three types of rock. LA: <https://www.coolkidfacts.com/rocks-and-minerals/>  <https://www.bbc.co.uk/bitesize/guides/zgb9kqt/revision/2>  - CLT map: tree map to classify sedimentary, metamorphic and igneous rocks, including formation and examples of each.  - ‘Which type of rock?’ AfL activity using pictures of each types of rock for students to classify.  Practical opportunity – how does the rate of temperature change affect crystallisation? Investigating the crystals formed when solutions (e.g. copper sulphate) are crystallised at different rates.  **3) What is the rock cycle?**  - DIN task: Knowledge based recall questions based on content from previous lessons. Students use pictures of each type of rock to discuss processes of formation.  - Decode it now: Cycle  - Rock Cycle Song to introduce formation of sedimentary, metamorphic and igneous rocks.  <https://www.youtube.com/watch?v=G7xFfezsJ1s>  - Label blank illustration of rock cycle to describe steps and processes involved. Use eChalk Rock Cycle activity as AfL.  <https://subscription.echalk.co.uk/Science/chemistry/rockCycle/rockCycle.html>  - Optional: Comic strip type activity to show ‘life’ of a rock, including stages of weathering, transport, erosion, deposition, compaction and cementation and link to formation of rocks.  Additional reading opportunity: Recent volcanic eruptions, living near a volcano e.g. <https://theday.co.uk/stories/the-volcano-burning-through-homes-in-hawaii>  - Plenary: What rock? Quiz game.  **4) Combustion**  **-** DIN task: Knowledge based recall questions based on content from previous lessons. Recall questions from previous chemistry units on what is needed for a fire to burn.  - Decode it now: Combustion  - Demo – whoosh bottle to show complete combustion; discussion around reactants and products.  - CLT map: bubble map with everyday activities that release energy by combustion.  - CLT map: similarities and differences between complete and incomplete combustion.  *- Extended writing opportunity (problem solver): ‘Explain how incomplete combustion occurs and the problems that it can cause’*  Practical opportunity – do all fuels release the same amount of energy? Investigating temperature change of water with different fuels.  **5) What is the carbon cycle?** - DIN task: Knowledge based recall questions based on content from previous lessons. Recall questions from previous biology units to assess knowledge of photosynthesis and respiration.  - Visual memory task - students to memorise and formulate word equations for photosynthesis, respiration and combustion. Challenge: include symbol equations.  - Label blank illustration of carbon recycle to describe each stage of the carbon cycle. Use eChalk Rock Cycle activity as AfL.  <https://subscription.echalk.co.uk/Science/biology/carbonCycle/carbonCycle.html>  **6) What makes up the atmosphere?**  - DIN task: Knowledge based recall questions based on content from previous lessons. Students given list of gases in atmosphere and asked to guess relative abundance.  - Decode it now: Atmosphere  - Use pie charts to compare gases in atmosphere from 4.5 billion years ago to last 200 million years.  - Video describing and explaining changes in carbon dioxide, oxygen and water vapour over time.  <https://www.youtube.com/watch?v=l0h_-3M0Pso>  <https://www.youtube.com/watch?v=gwGeH9O8Rx4>  - CLT map showing causes and effects of changes in methane, carbon dioxide and oxygen  *- Extended writing opportunity (problem solver): ‘Describe and explain the differences between the Earth’s early atmosphere and the Earth’s current atmosphere.’*  **7) How does human activity contribute to global carbon dioxide levels?**  - DIN task: Knowledge based recall questions based on content from previous lessons. Students asked to try and write their own definition of global warming.  - Identify 3 greenhouse gases. Use analogy of a greenhouse to explain why they are called greenhouse gases.  - Students label diagram of greenhouse effect to explain how they cause global warming.  - Information hunt activity to investigate human activities which produce carbon dioxide and methane.  - CLT map: Brace map and flow map showing human activities which produce carbon dioxide and methane.  **8) How do carbon dioxide emissions impact the climate?**  - DIN task: Knowledge based recall questions based on content from previous lessons. Students to write down three effects of global warming.  - CLT map: Use pictures of rising sea levels, floods, fires etc to create bubble map about causes of global warming.  - Video to show effects of global warming on the Earth.  <https://www.youtube.com/watch?v=EtW2rrLHs08>  Specific to animals: <https://www.youtube.com/watch?v=_JhaVNJb3ag>  - DART activity on Australian bush fires and effects of climate change.  - CLT map - mind map to explain national and global strategies in place to reduce emissions of greenhouse gases including discussion around Paris agreement.  - Extension: Use graphical data to make links between carbon dioxide levels and temperature of the Earth.  *- Extended writing opportunity (problem solver): ‘Some scientists believe that human activity is the cause of global warming. Do you agree or disagree with this statement?’* Construct arguments for or against human activity and global warming | | | | |
| **How you will be assessed:** | You will be assessed by:   * A retrieval quiz during the Do It Now of every lesson. * Mini quizzes and challenges during lesson. * A progress assessment in the middle of the unit – Here we will reflect and improve on key areas and complete DIRT work.   An end of unit assessment that assesses your knowledge and skills that you have built in this unit and previous units that we link back to. | | | | |